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ABSTRACT

Structural reading difficulty of argumentative prose (text with an underlying message or superordinate principle), is related to the reader's approach to reading and learning. Ninety Swedish teenagers and adults with varying levels of formal education, were divided into three groups, based on their own descriptions of reading and learning: deep approach, surface approach, or neither. Subjects read a 3,700-word argumentative passage and were given a 28-item retention test. Although the deep group performed significantly better than the surface group, the latter performed considerably higher on factual questions alone, as opposed to conceptually more difficult questions. Another experiment focused on readers' ability to realize that an excerpt was only an example, introduced in the text to illustrate qualitative differences in the outcome of learning. The surface group did not know why the example was included; that is, they saw the principle and example as two different topics with solely a serial relation. The reading difficulty examined in both experiments was not a function of content (words used, sentence length, etc.), but was not totally unrelated to content. In conclusion, reading difficulty should be viewed in relation to structure, content, and the reader's description of his/her approach to learning. (CP)

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ABSTRACT

In everyday thinking as well as in research the problem of what makes a text difficult to read and to understand is often thought of in terms of, for example, the complexity and length of the sentences, the relative number of low-frequency words, etc. While this perspective might be applicable to what can be called descriptive texts, the present paper reports a finding on another type of difficulty which does not primarily seem to have to do with the words used but rather with the structural characteristics of what we might call argumentative texts. A significant feature of such written communication is that it is written on different levels as it were. Very often one finds a superordinate principle (idea, central point, etc) which is supported (illustrated, explained etc) by means of a number of examples, facts and/or arguments.

In this paper an empirical study of the difficulties involved in reading such argumentative prose is reported. It is argued that a significant factor in determining whether people can handle such structural difficulties is the perspective in terms of which they interpret the text (such differences in perspectives on learning have been described in two previous articles in this series). Furthermore, it is illustrated how people who are unsuccessful in dealing with this vertical dimension of such texts either do not notice that there is such a variation in depth or reduce this kind of complexity through a process of horizontalization , i.e. differences in the vertical dimension are perceived as and reduced to differences in the serial ordering in the text.

INTRODUCTION

This paper is about the difficulty in reading texts. Difficulty is seen as a relational concept, i.e. it is not considered as an inherent quality of the text; no text is difficult in itself. A difficult text is always difficult for someone, difficulty is thus a relationship between the text and the reader.

In a sense this is a truism, of course. There can be no ultimate measure of difficulty but the ease by which the reader can read and understand the text. The relational character of difficulty is, however, something which is taken for granted, something which is tacitly assumed. And exactly because of the tacitness of this assumption it is very infrequently thematized (i.e. made into an object of attention), the relational character of reading and learning difficulties is seldom a target for empirical investigations.

In everyday life, the difficulty of a text is mostly judged on the basis of the words used in text: the less frequent the words the greater the difficulty. Understanding a text is commonly seen in terms of understanding the words comprising the sentences in it. This conceptualization of difficulty is, however, not restricted to the world of common-sense notions but - at least from the operational point of view - it is dominating in the context of research as well. The difficulty of a text is measured by using a set of items indicating the ease by which people can understand or recall certain issues appearing in the text. To the extent that these items concern the understanding or the recall of words, factual details, sentences, the difficulty of the text can be operationalized in terms of purely words, factual details and sentences.

This type of difficulty is obviously linked with the serial order in the text. If we regard a text only as a text in itself it appears "flat", as it were. Words follow words and sentences follow sentences. If a text is regarded as a sum of words and sentences, what else could be difficult other than words and sentences? The outcome of a test of difficulty - seen from this perspective - will be a function of whether or not the reader, on the one hand, possesses the necessary prerequisites (linguistic skills, knowledge of words and factual

details) for understanding the words and sentences and, on the other hand, of whether or not he paid attention to the various parts of the text.

There is, however, obviously another dimension of texts as well. Texts are always about something and thus they should not be considered purely as texts in themselves. If the text is simply a description of something the serial (or horizontal) perspective holds fairly well. We list one detail after another; "First this and then this". If the text represents what we call argumentative prose, however, then it is structured by the author in terms of different levels. There is always some superordinate principle, central point or underlying message. In order to support (illustrate, explain) the main theme there are facts, arguments, examples brought to the fore. In order to grasp the meaning of the text the reader has to focus his (her) attention beyond the pages so as to speak. Such a focussing of attention presupposes an approach to the text characterized by the notion that there is something to look for through or beyond the text. The reader must assume that the text is about something and that there is a vertical dimension in the text as it were, a dimension representing a variation in depth.

In order to understand the text the reader has to discern its different levels and in order to do that he must have an orientation towards an understanding of the text: the deeper this orientation the better.

That people can handle such structural features (for instance, that examples are presented in order to illustrate a principle, or that facts are presented in order to support a conclusion) is as a rule taken for granted by authors, massmedia workers as well as by teachers, at least at the secondary and post-secondary level.

Argumentative prose is, however, a cultural artefact. It is a mode of communication developed alongside the rise of philosophy, science and technology. It has been demonstrated previously that one of the main factors underlying the differences among university students

in the outcome of the reading of academic pieces of writing is the differences in their approach to the task. Some students seem to consider the text in itself, seeing it as "flat". Learning for them is learning (i.e. memorizing) the text as such. Others realize, however, that the text is about something, that it has a dimension of depth as well. Learning for them is finding out the message the author intended "to get through" by means of the text. Consequently the former orientation has been called surface - and the latter deep-approach (Marton 1975, Marton and Säljö 1976). Furthermore, in a related study, Svensson (1976) described the close relationship between students' approach to the reading of a text and the likelihood of their grasping the facts-conclusion structure in it. Just as the mastering of the first type of difficulties can be seen as a function of the reader's previous knowledge of the words and facts necessary to understand the words and sentences on one hand and of what he is paying attention to during the reading on the other, the mastering of the second type of (structural) difficulties is regarded as mainly a function of the reader's previous understanding of notions basic to the grasping of what the text is about on one hand, and the level at which he approaches the text during reading on the other.

This paper has three main aims. Firstly, we want to draw attention to this kind of structural difficulties which can hardly be overcome by for instance, simply rewriting the text and therby substituting difficult words with easier ones. Secondly, we would like to demonstrate that this type of difficulty consists, to a large extent, of difficulties in relation to the way the reader approaches the text. Thirdly, we intend to describe how this type of difficulty is handled by people, by those who master it and by those who do not.

METHOD

The data which we are going to use in order to illuminate these questions, were arrived at in a larger study concerning how people approach the task of reading and learning from normal text materials.

An experiment was set up which was carried out individually and orally and which consisted of five major parts:

1. An extensive interview concerning the subject's method of study and his conception of phenomena such as learning, knowledge, education etc.

2. The reading of a text (see below).

3. Summarizing the main point of the text, free recall of the text, answering a number of questions on how the subject set about learning in this particular experimental situation, and, finally, answering a set of questions on the contents of the text.

4. A concluding interview on the subject's experience of the situation and of the process of learning.

5. Finally, the subjects were required to take two standardized tests, a vocabulary test and Raven's progressive matrices.

The whole experiment lasted between two and four hours.

Subjects

In all, 90 subjects took part in this study. They represented three different educational levels: short (S) 6-9years, intermediate (I) 12 years, and high (H) with a level of formal education of at least 14 years. The variation in age between subjects was considerable, from 15 years and 7 months up to 73 years and 3 months. The subjects were volunteers and they were paid for their participation.

The text

The text used in this experiment is a 7 1/2 page (3.757 words) introductory text on learning divided into three main sections. The first section (approximately 850 words) deals with classical conditioning. It starts with an example of how a prisoner while being tortured has been conditioned to respond with convulsions at the mere sight of the electrodes which have been used to torture him. Following this, the basic principles of classical conditioning are described and the name of Pavlov is introduced and the circumstances of his discovery are also briefly presented. The second part of the text contains a corresponding presentation of instrumental conditioning (approximately 550 words) introducing, besides the basic principles, also the name of Skinner and his work. The rest of the text contains a presentation of our own previous research on learning. Two selected main findings are described: first, the findings on qualitative differences in approach to learning, i.e. the distinction between deep and surface approach mentioned above and further illuminated below; second, a concrete example is given to illustrate the findings on qualitative differences in the outcome of learning.

In accounting for the results in the present paper, this latter example of qualitative differences in the outcome of learning plays a central part, since it is used as an example of structural difficulties in certain types of texts. We shall therefore go into it in detail as we illustrate the difficulties of coping with structural complexity.

Procedure

As we pointed out above, the experiment started with a fairly extensive interview concerning the subject's methods of study (e.g.How do you usually set about learning?, How do you prepare for tests? etc) as well as a number of more general questions having to do with his conception of phenomena such as learning, knowledge, education etc (e.g. Why do you think some people are more successful at learning than others?, Looking back at your studies at basic school upper secondary school/university, what would you say is the most important thing you have learnt?, What do you actually mean by learning?).

The idea behind these types of questions was to find out whether the distinction described above between a deep and a surface approach to reading and learning could be found in the subjects' spontaneous descriptions of their methods of study and/or in their conceptions of learning (cf Säljö 1978a).

The duration of this introductory interview varied somewhat, the average being approximately 30-35 minutes with a range of 25-45 minutes.

Following this, the subjects read the text with no time constraints. The instructions given to the subjects were to read the text until they "had understood it" and then be prepared to recall it in broad outline and to answer some questions on it. Owing to the fact that there were no time restrictions there was of course considerable variation between subjects with respect to the time spent on reading. The average time was 38 minutes and the range 16 to 75 minutes.

Immediately after the recall of the text subjects were asked a set of questions on how they set about learning in this experimental situation. After this followed 28 questions on the text. As pointed out earlier all subjects were interviewed individually and the whole seesion was tape-recorded. The analysis of data was carried out on the transcripts.

RESULTS

Conceptions of learning

When it comes to describing people's experiences of the world around them the researcher should be aware of his own preconceptions as to how people structure their realities. It is, of course, essential that the researcher attempts to be open to find out whether or not people's experiences are in accordance with his own preconceived notions. This, of course, is a methodological dilemma which is very difficult to solve. In the present case, this problem is very obvious since the introductory interview dealt with among other things the phenomenon of learning which we have studied earlier with a similar approach. A delicate problem is then to keep a balance between an unbiassed attitude towards new information and an interest to confirm earlier conclusions regarding people's approaches to reading and learning.

In the present study it was possible to describe the subjects conceptions of learning in a slightly different way compared to our previous descriptions in terms of two approaches. As a result of e.g. the 90 subjects answers to the question "What do you actually mean by learning?", five different conceptiosn could be discerned (cf Säljö 1979a). There is no need to go into these findings in any detail in this context, but it should be pointed out that the fundamental distinction between a deep approach and a surface approach is a dominating characteristic in the description of the differences between these five categories as well even though some finer distinctions could be made. Similarily, in an analysis of the subjects' complete descriptions of their study methods and learning activities Säljö (1979b) argues that it seems as if a person's conception of learning can develop from a surface approach, where the memorizing nature of learning is taken for granted, to a deeper approach, where the subjects recognize that learning has a "vertical" axis in the sense that when learning you should attempt not only to memorize the text as such, but also and far more important, try to understand and think through e.g. the perspectives which a piece of writing represents, the underlying assumptions of the author, the message of the text in relation to your previous view on this specific problem etc.

To give an illustration of the nature of our data and at the same time to clarify the distinction between the two approaches to reading and learning, a few excerpts from the introductory interviews will be given. The first three quotations illustrate subjects who show evidence of using a deep approach as described in our earlier research.

"I: What do you actually mean by learning?
S: To learn, well that's to ... the important point is that you understand it, that you get it. Then, if you can say by it by heart, that's not ...
The important thing is that you grasp the meaning of it all, the meaning behind it, why it is this and that ..
Of course, I ...it's different, some things you have to know by heart like in Languages and such there isn't really that much to understand ..."
(Subject 3 S[1])

"I: What does it mean to you to know something? What does it mean to you?
S: It is, well, for example take the subjects I am studying, let's say History for example, it means that I should be able to understand a lot more about what development really is, sort of understand the processes in a country or among a people in some way ... and you don't necessarily understand that simply because you know a lot of facts and so on, I don't think there is always any direct connection...."
(Subject 32 H)

"I: What you are reading just now ... what do you think about the different subjects? Which ones are difficult and which are easier?
S: Well, I don't know. I have always been very interested in Swedish, I have always thought it enjoyable, but I actually think it is most difficult because there are an awful lot of ... I mean the way the exams are constructed there are an awful lot of things you have to know by heart and since I find it a bit of a problem with all these names and dates and such things ... I think it's rather difficult not to confuse all this in the exams. They are not asking for a context but rather it's more ..
I: Is it like this at the upper secondary school for adults to?
S: ... and I think this sort of thing is rather unnecessary. But otherwise, I don't think this is any direct difficulty. It's only a lot of facts ... The only thing you have to do is to sit down and read.
I: Is there a lot of this sort of thing when you think about the other subjects too?

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[1] Indicating level of formal education.

S: Well it's not all that bad ..
I: ... but it's too much like that for your taste?
S: Yes, I think it's too much like that for my taste. I think you should pay more attention to the larger contexts and the essentials in what you study instead.
I: Is that the way you do it yourself when you are studying?
S: Yes, when I read something, if I read a book or whatever, then I am not so bloody interested in ... well of course I am interested in it in a way, I mean, I read the title of it, who's written it and so on, but what I find most interesting is not the names of bloody persons in the book, I find that rather uninteresting. Instead its what the book is trying to say that is really interesting."
(Subject 55 L)

These quotations clearly illustrate deep approach in the sense that subjects emphasize that learning involves an active abstraction of meaning from texts (Säljö 1978b) and not a mere reproduction of the texts themselves. This latter mode of describing learning is, however, quite obvious in the following excerpts.

"I: What do you actually mean by learning?
S: Well its to memorize what's in the books. In principle I would say its to be able to answer the questions which the teacher gives you ...."
(Subject 33 H)

"I What do you actually mean by learning?
S: Well, to learn facts ..."
(Subject 33 I)

"I: And what about History, what were they (the tests) like there?
S: Far too few dates and too few wars and things, instead they concentrate most on the social conditions and the economic conditions, that's what they concentrate most on, so that it is .. and its exactly the same thing in History of Literature, you learn far too little about the authors, you just learn what they write ...
I: How ... the exams, how are they constructed? Are the questions wide in scope and so on so that you are able to use your own words?
S: In the history of Literature there were quotations from lots of different authors and being able to remember all these passages you had been reading through at school, that was rather difficult for most of us.
I: What about History?

S: History, it was ... well the questions we had were most about the causes of that and that war and ...
I: Don't you like those sort of questions?
S: No, I don't like those sort of questions.
I: What kind of questions do you want?
S: I want questions straight to the point. 'Who was Napoleon?' and 'When was the French revolution?' and okay 'Why did it happen?' is also allright ...
I: Why is it that you prefer such straight questions?
S: Because I think its easier for the student to learn and remember them. At least it is for me personally.
I. You think its easier to learn such ...
S: Yes, I prefer that. I prefer a date for example or a question 'When was that?' or maybe there is a date and then you should be able to combine that date with the right event, I prefer such questions ..."
(Subject 66 S)

In contrast to the previous ones, these quotations contain descriptions of learning where it is obvious that the object of learning is the text itself. Thus, it seems as if an essential element in our previous studies, where students have described their own learning in relation to the reading of a text in an experimental situation, have been confirmed in the present study even though the descriptions of the background and the nature of these approaches has been further developed (cf Säljö 1979a, b). However we consider the finding that the basic distinction between deep and surface approach has been possible to discern in the present data as well as an important result.

The experience of learning

The point of departure for this paper was that structural difficulties in written materials should be considered in relation to the reader's and/or learner's approach to these materials. However, for various reasons it is obvious that the learner's approach to a text is not only linked to his general conception of what it takes to read and/or what it takes to learn. It seems fruitful to assume that his perception of the immediate context is of decisive importance as well. It is reasonable to assume that in a particular situation the learner may behave in accordance with another conception than the one described in another situation. For this reason it is important to take into account what subjects say about how they approached a particular reading and/or learning material.

To be more concrete, it seems very likely that an experimental situation in itself may affect a person's approach. Therefore, in deciding which subjects had used one or the other approach, a second step in the selection procedure was to analyse their descriptions of this particular experimental situation. To make a rather long story very short, we found that several of the subjects who in the initial interview gave descriptions of learning which belonged to one or the other of the two approaches, in this experimental situation had behaved in a way which was not in accordance with their normal approach to this type of material. In particular, there were quite a large number of students who indicated that the experimental situation per se influenced them to learn the text as such rather than the message, i.e. they adopted a surface approach in this particular situation even though they had described themselves spontaneously in the initial interview in terms which would indicate that they belonged to the opposite group. The following is an example of such a reaction to the experimental situation.

"I: Do you have a feeling that you go about it differently when you're alone and trying to learn something?
S: Yes ... I suppose I do ...
I: In what way ...?
S: Yes, I take it easier sort of thing ... yes, one sort of revises .. one doesn't need to through the text so quickly. One has more time to go through a section and sort of think about it .. what it's all about .. yes, in that way it's easier to find out what it's all about.
I: Were you more tense than you are usually .. now when you were reading?
S: No, I can't say I was ..
I: This business about having to recall the text afterwards .. was that on your mind ..?
S: Yes
I: How did it affect you?
S: Yes, I tried to memorize .. I was supposed to remember this and that .. but you have to do that in other situations too, but it's obvious that you get more tense when you think about it. So perhaps you forget it just because .."
(Subject 21 I)

There were also some subjects who reacted to the contents of the third part of the text, where the distinction between deep and surface approach was described, by saying that they started to think for the first time about how they actually learn and that they had attempted to really think about what they read about instead of merely memorizing it. Interesting as this may seem from a peda-

gogical point of view, it nevertheless leaves ut with some uncertainty as to what extent this may have influenced their approach.

Constitution of groups

The actual selection of subjects for studying the relationship between approach to reading and learning and structural difficulties encountered took place in two steps. As a first step, the subjects' descriptions of their approach to reading and learning were analyzed. As a result of this, three groups were formed. The first two groups contained subjects who were clearly identified as representing either a deep or a surface approach (about 40 per cent in each category), while the third group formed contained subjects who could not be placed in any of these two groups (about 20 per cent). There were essentially two reasons why subjects were not classified as belonging to either the deep or surface category: first, there were a number of subjects who gave very vague and short descriptions of their own approaches in spite of several attempts from the interviewer to elicit more extensive descriptions; second,a number of subjects gave descriptions which could be considered to belong to both these approaches.

As a second step the experiences of the experimental situation of the subjects identified as representing either a deep or a surface approach were analyzed. As indicated above it was obvious that the experimental situation by itself might cause subjects to behave in a way which is not in conformity with their normal way of learning or reading. As a concequence of this these subjects were excluded from further analyses.

After these two steps 36 subjects remained, 16 of whom were categorized as representing a deep approach and 20 categorized as representing a surface approach. The level of formal education of the subjects in the two groups can be seen from table 1.

Table 1. Level of formal education of subjects categorized as representing deep and surface approach respectively.

	Level of formal education			
	Low	Intermediate	High	Total
Deep	4	3	9	16
Surface	6	8	6	20

It should be pointed out that this rather complicated procedure of selecting subjects has to be viewed in the light of the exploratory nature of this study. In investigating the possibility of a relationship between approach to written materials and the type of difficulties encountered it is of course advantageous to compare groups which seem to be relatively "clear" with respect to their approach. Finally it could be mentioned that in selecting subjects for either group, essentially the same procedure was followed as in our earlier studies. The criteria defining the characteristics have been described briefly by Marton and Säljö (1976) and in detail by Marton (1974).

Structural difficulties in the text in relation to the reader's approach to the text

In analyzing the outcome of the learning experiment we find that there is a considerable difference between the two groups in their performance on the retention test. The average number of correct answers in the deep group is 21.1 (out of 28) corresponding to a proportion of correct answers of 75 per cent, while for the surface group the result is considerably lower, 13.1, corresponding to a proportion of correct answers of 47 per cent. However, in the present case we are, of course, not interested in the overall differences in performance between groups. Rather, the present problem concerns the question whether there are any differences between these differences, i.e. whether there are significant differences between the two approaches with regard to various kinds of difficulties in the text.

To shed light on this problem we need to make a division of the outcome which in some way corresponds to the difference between the two approaches. This can be done in a number of ways, but in present case a very simple procedure will be followed.

In examining the 28 questions in terms of which the outcome was measured, it can be seen that they represent various kinds of difficulties. From our previous description of the surface approach it would seem that these subjects focus their attention on information which has a very factual character and which can be derived more or less verbatim from the text. Among the 28 questions there are a few questions which concern the retention of such purely factual material. The following are the most obvious examples of such questions:

Question 10 Who discovered classical conditioning?

13 Who is most connected with research into instrumental conditioning?

16 What is the device called which is commonly used for studying instrumental conditioning?

17 How is the Skinner box constructed?

As can be seen these questions contain no structural or conceptual difficulties of any kind. They merely require answers which can and, as a matter of fact, must be reproduced directly from this text. In comparing the proportion of correct answers of the two groups on these particular questions we find the following.

Table 2. Comparison of deep and surface groups on performance on factual information.

	Question				Proportion of correct answers	
Group	10	13	16	16	factual information	over all
Deep	94	81	56	69	75	75
Surface	65	80	50	50	61	47

In this table, some interesting observations can be made. First, there does indeed seem to be a difference between the differences, since

the over all difference in proportion of correct answers of 28 per cent is halved into a difference of 14 per cent only. Thus, the difference between the two groups becomes much smaller when the type of material focussed upon is somehow congruent to the approach of the surface group.

Second, if the performance of the two groups in these questions is compared to their over all performance, we find that the surface group obtains a result which is considerably higher (61 against 47 per cent) while the deep group obtains exactly the same result (75 per cent). Thus, apart from the fact that the difference between the two groups in this type of material decreases, the present data indicate that in a within-group perspective the performance by the surface group on this type of factual information is better than on other types, such as e.g. information which is conceptually more difficult. Of course, at this point one might ask the following question; if this latter assumption is made in connection with the performance of the surface group, why does the same result not appear in the case of the deep group? Obviously their performance on factual information questions is not very much affected by the fact that they do not focus their attention on this kind of material while reading. In this context it can be mentioned that in our previous studies it has never been the case that a deep approach has led to any noticeable drop in performance on this kind of information. On the contrary, in some cases where long-term retention of facts has been measured it has been shown that a deep approach is associated with better performance compared to a surface approach (cf. Säljö 1975, p 117; Marton et al 1977, p 24).

Above, we have illustrated that there seems to be a relationship between approach and retention of a certain type of information. In this case, the outcome is described in terms of the number of correct answers to a number of questions. As is well know, this is the conventional way of describing the outcome in studies of learning and reading. However, as we come to our next problem, i.e. that of illustrating the relationship between approach and the structural difficulties of argumentative texts described above, it is obvious that a description in merely quantitative terms is unsufficient. Rather, what is more interesting is, of course, to find out how subjects with different approaches deal with such structural diffi-

culties. In other words, even in the cases where subjects fail to grasp the relationship between an example and a principle, it is of course of considerable interest and importance to examine in closer detail what they get out of such passages and how they handle them. In view of this we shall present our findings concerning this kind of structural difficulty by means of a rather detailed description of an example.

As mentioned earlier, the third part of the text used in the present experiment contained a presentation of our own previous research. To illustrate the idea of qualitative differences in the outcome of learning, an excerpt from a text used in an earlier experimental study was included together with quotations from subjects illustrating three qualitatively different levels of outcome in relation to this particular excerpt. To facilitate the understanding of the following we shall reproduce the relevant section of the experimental text in full.

Excerpt from experimental text

In another experiment, a number of subjects (still one at a time were required to read some chapters from a university textbook under varying conditions. The following passage was a part of one of the chapters.

> "Another common source of difficulty is the imbalance between the output of sub-professionals and full professionals in associated fields. The proper ratio may differ by countries and by fields, yet it is still a universal problem. If the trained professional is to be fully productive, he must be backed by sufficient paraprofessionals and technicians who can perform appropriate supporting tasks. Guy Hunter suggests that the optimum ratio of technicians to university graduate specialists is between 3:1 and 5:1, depending on the country and the subject. Against this norm, he and other investigators have found that in many developing countries this ratio is often 2:1 at best and sometimes only 1:2. In these circumstances full professionals end up doing the tasks which sub-professionals should be doing.
>
> A good example of this is provided by Chile, in the field of health, where an investigator reports three doctors for each nurse, in contrast to Sweden's ratio of five nurses for every two doctors and the United States ratio of seven nurses for two doctors. To make matters worse, the

> number of nurses graduating in Chile has recently been about half the number of doctors. And a high proportion of these nurses soon depart from the hospital to marry or emigrate to the United States for better pay (since the United States also has been underproducing nurses)." (Coombs, 1968, p 77)

After reading through it, the subjects among other things had to recall the contents of the text. When the retention of this passage could be traced in the recalls it appeared in different forms. As a matter of fact, it was possible to identify three different levels. At the most superfiical level all that could be observed was a mere mentioning of it e.g.

> "... there was some discussion about the proportion of fully trained specialists and sub-professionals ...."

At the next level there is a description of the actual relationship e.g.

> "... and the problem of closely related occupational categories was also mentioned. Chile and the USA are used as examples and there were completely different proportions of nurses to doctors. In Chile it was one to three while it was seven to two or something like that in the USA."

At the deepest level there is besides the description, also conclusion e.g.

> "... and this means that the qualified specialists will have to carry out the tasks for which they are over-qualified."

Since the original of this latter quotation is expressed explicitly in the original text ("In these circumstances full professionals end up doing the task which sub-professionals should be doing") it could be argued that it seems rather random whether you include it or not in the recall. However, this is not the case. Thinking in terms of cause and effect relationships e.g. that you realize that the specific information which is given in the text is an example of a sign of certain underlying conditions, is a distinguishing feature of a deep approach to learning.

Our interest here is thus focussed on finding out whether the subjects would have any difficulties in realizing that the excerpt from Coombs was only an example introduced in the text with the specific purpose of illustrating qualitative differences in the outcome of learning. To study this, two questions referring to this particular passage were introduced. The first question simply asked whether they remembered the example as such and the second, which is the one of main interest here, asked why the example was included in the text.

Questions:

24. There was an example in the text taken from a textbook which the subjects had to read. Do you remember that example?

25. Why was the example placed there?

In looking at the proportion of correct answers to these two questions we find that as far as the mere remembering of the example is concerned the difference between the groups is comparatively small, 63 per cent for the deep group compared with 50 per cent for the surface group. This can, of course, again be interpreted as an indication of the finding reported above; when it comes to a mere reproduction of various parts of the text itself it seems plausible to assume that the differences in performance between the groups become smaller. However, in looking at the next questions we find that indeed the difference between the groups has increased considerably, 56 per cent for the deep group compared with only 15 per cent in the surface group (those subjects who could not answer the previous question were reminded of the example by the interviewer before being asked the next one).

As pointed out above, it is however, more interesting to find out how the subjects actually dealt with this structural difficulty. Before going into illustrations of subjects who failed, two examples will be given which illustrate answers which give evidence of the fact that the hierarchical nature of this part of the text has been clearly perceived.

"I: Why was that example placed there, do you think?
S: Why it was placed there ... Yes, well, I think it was a good way to ... well the point was that they were interested in measuring qualitative differences in knowledge among subjects ... and I think this was a good way to do that, I mean it was a good text for that purpose ..."
(Subject 73 I)

"I: Why was that example placed there, do you think?
S: Well its to account for this phenomenon which has to do with different sorts of learning among the subjects ... those who had read it in a deep way, they really found out what it was all about, I mean the point of the text ..."
(Subject 63 H)

In all there were 24 subjects, 17 from the surface group, who in their answers to this question did not reveal that they had been able to cope with this structural difficulty. (Here, it should be pointed out that for the reader of the present article a further level is added, thus making this text even more difficult from the structural point of view. In the experimental text the readers were required to realize that the excerpt from Coombs was an example. In the present case, however, our focus of interest is on whether the subjects could handle this structural difficulty, thus making the experimental text in itself an example) Of these 24 subjects 10 said that they did not know why this passage had been introduced in the text. In most cases these subjects could, however, recall the example as such more or less accurately

"S: Oh yes well, no ... it was about how many doctors there where in Chile. Yes, they had two doctors to one nurse in Chile approximately and then there were three doctors or something in the US ... What was it more about? ... Well, I guess that's it really....
I: Why was that example placed there, do you think?
S: Yes, well, as a matter of fact I never understood that."
(Subject 26 S)

"S: It was about the proportions of highly qualified personnel to the number of assistants ... where they said that the proportion should be two to one, three to one ... but where in the developing countries its more like one to two .. hm .. two to one. Then they gave the example of the shortage of nurses in Chile where there were three doctors to one nurse compared to Sweden where there are two doctors to five nurses and the US where there are two to seven.
I: Why was that example placed there?
S: I don't know ..."
(Subject 76 S)

The remaining 14 subjects, although giving somewhat different answers, all give explanations which reveal that they did not realize that this particular passage was an illustrating example subordinated to the main theme of the text. In most cases, the answers reveal that subjects believed that the passage had been included in order to give them some information on either the problmes of educating academic specialists and assistants in suitable proportions or on the educational problems of developing countries. Thus, the failure to cope with this structural difficulty led to the impression that the Coomb's excerpt represented a part of the text itself, i.e. it was perceived not as subordinated to the main theme which was reading and learning, but as standing alongside the main theme, being a section on its own. As a consequence of this they answered the question "Why was that example placed there, do you think?" with the conclusion from the excerpt itself.

"S: ... it was about Chile and the US and Sweden... about how many doctors they had on a number of nurses. In Sweden it was two to five in the US it was two to seven and in Chile three doctors to one nurse.
I: Why was that example placed there, do you think?
S: To illustrate that those who had an academic training I think,... anyway that those who had a very high education got worse jobs than what they really should have ..."
(Subject 36 S)

"S: Well it was about the training of doctors and nurses, a comparison was made between different countries Chile, US and Sweden. Well, in Chile e.g. they trained many doctors in relation to nurses and in Sweden it was the other way round, more nurses in relation to doctors and in the US there were still more nurses in relation to doctors.
I: Why was that example placed there, do you think?
S: Yes, well, they said that you have to train people at different levels so that the people who have a high education can concentrate on the most important things sort of, and have people with a lower education as assistants."
(Subject 33 I)

There were also explanations following slightly different lines of reasoning, e.g. that the excerpt had been included to show the superiority of the industrialized countries in comparison to the developing countries, that it illustrated the importance of education in general, etc, but still revealing the tendency not to perceive the subordination of the example to the main theme of the text, but rather treating it as a theme in its own right.

To sum up, the aim of this comparatively close examination of this particular example has been to illustrate how subjects handle this kind of structural difficulty. What we have seen is that subjects using a deep approach deal with it much more efficiently than subjects using a surface approach. In the present case, the difference in proportion of correct answers was 56 per cent compared with 15. In examining more closely how the subjects actually deal with it, we find a group of subjects who do not know why this example was included and another group who in their explanations reveal that they had failed to perceive the example as an example, but instead they regard it as a separate theme. In answering the question of why the example was included in the text, the subjects in this latter category start talking about the educational problems in Chile, USA and Sweden instead of about qualitative differences in learning.

DISCUSSION

In this study we have pointed to a type a difficulty in relation to reading and learning. This particular kind of difficulty which does not seem to occur mainly as a function of the words used, the length of the sentences, etc, consists of people sometimes failing to perceive the fact that certain texts are written at different levels. One could say that people sometimes fail to perceive the vertical aspect of written material, thus treating the various levels without realizing the logic of the material itself. The text appears "flat" as it were. A principle and an example, for instance, are conceived on the same level. Instead of realizing the superordinate relationship of the principle to the example, the principle and the example are understood as two different topics with solely a serial relation between them, one follows the other.

This finding which we call horizontalization has also been described in another study by Wenestam (1978). In Wenestam's study the phenomenon of horizontalization was described in relation to people's choice of perspective in recalling a text. The text was about the principles of the Swedish social wellfare system and it also contained some concrete examples of people who had come into contact with this system. In recalling the text it was observed that several subjects failed to perceive hierarchical relationship between the superordinate theme which the text was about and the subordinate status of the illustrations. Thus the findings of Wenestam seems to be parallel to those of the present study.

In saying that we have found a type of difficulty in reading which does not seem to be mainly a function of linguistic form does not of course imply that it is completely independent of, or unrelated to this aspect. Even less do we claim when we use the term structural difficulties, that such difficulties can be seen as being separate from the contents. On the contrary, we emphasize that structure and content cannot be separated from one another except for analytical purposes. As a consequence we would like to argue that a construct such as structural difficulty should be conceived of as a category of description which refers to an aspect of an indivisible whole. This construct can then be used e.g. for making teachers aware of the kind of difficulty a student might have in relation to written

materials. However, should we wish to make statements about a particular text (or a particular person) we have to be aware of the indivisible character of structure and content. It is our firm conviction that purely structural difficulties seldom occur, even if a considerable portion of psychological research seems to be based on this assumption. Therefore, in arguing for the idea that structural difficulty should be thought of as a category of description referring to an aspect of an indivisible whole, we remain open to the conclusion that in concerete cases the difficulties can be more fruitfully understood in terms of the contents of the written materials in question.

We have also tried to show that this type of difficulty should be viewed in relation to the readers' approach to the text. What we have found is that persons who have a conception of learning which among other things, makes them sensitive to such structural difficulties, are more likely to be able to deal with them successfully than persons who have the alternative conception of learning. In this sense there is a tautological relationship between the description of approach to learning and reading and the description of difficulties encountered. In other words the description of differences in outcome follow logically from the nature of the differences in approach. Following Smedslund (1978) one could therefore argue that there is no need for testing this relationship by means of empirical studies (in fact the tautological nature of the relationship of course makes empirical "tests" impossible).

However, while we are in complete agreement as to the tautological relationship between our descriptions of approach and outcome, we should like to argue that the tautological relationship is between the categories of description as such. Thus, we argue that in order to find these categories of description and to reveal their nature, empirical research is necessary or at least very helpful. Furthermore, the question of whether they are applicable or appropriate in a particular situation is also an empirical question.

Finally, an underlying assumption of our research is that it would be a great step forward if behavioural scientists would aim at descriptions of functional mechanisms rather than pointing to various corre-

lational relationships. In the present case we have tried to bring in this perspective into the study of problems in reading texts. We see the difficulty described as an encounter between two perspectives; the horizontal, in which subjects with a surface approach read the text, and the vertical, in which the structure of the argumentation in the text becomes visible. Horizontalization is the process through which the reader gives the vertical dimension an axial turn, representing different levels of depth in the text in terms of serial ordering.

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